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ABSTRACT OF THE DISCLOSURE

An optical wavelength-multiplexing system allowing long distance transmission with reducing effects of noise and fiber nonlinearities is disclosed. First wavelength-multiplexing light and second wavelength-multiplexing light within a wavelength bandwidth of 100 nm or more are propagated in opposite directions through the same optical fiber. The wavelength band of the first wavelength-multiplexing light is set to a shorter wavelength side as compared to that of the second wavelength-multiplexing light. In addition, excitation light having a wavelength shorter than the wavelength band of the first wavelength-multiplexing light is propagated through the optical fiber in the same direction as the second wavelength-multiplexing light. The excitation light is shorter in wavelength than the first wavelength-multiplexing light by an amount determined depending on Raman scattering characteristic of the optical fiber.